## CLAIMS

What is claimed is:

1. A device for safely recognizing a switch position angle of a rotary switch, comprising:

two redundantly configured computer units that determine discrete switch positions of the rotary switch by evaluating two digitized actual switch position signal values having a predetermined amplitude derived by A/D conversion from corresponding analog actual switch position signal values which reflect the switch position angle, with each computer unit separately checking the digitized actual switch position signal values for plausibility,

wherein if the two digitized actual switch position signal values are provided to the first computer unit and the second computer unit in the form of sinusoidal signals having each a constant amplitudes and being phase-shifted with respect to each other by 90°, then the plausibility check is performed such that the signals are deemed to be plausible if the sum of the respective squares of the digitized actual switch position signal values supplied to the first computer unit or the sum of the respective squares of the digitized actual switch position signal values supplied to the second computer unit is located in a predefined range.

2. The device of claim 1, wherein faulty switch position angles are identified by comparing the switch position angles determined by the first and the second computer unit.

3. A method for safely recognizing a switch position angle of a rotary switch, comprising the steps of

digitizing two actual analog switch position signal values having a predetermined amplitude characteristic which reflects the switch position angle,

providing the two digitized actual switch position signal values separately to two redundantly configured computer units in the form of sinusoidal signals having each a constant amplitude and being phase-shifted with respect to each other by 90°,

evaluating in the two redundantly configured computer units actual the two digitized switch position signal values, with each computer unit checking the actual digitized switch position signal values for plausibility,

determining discrete switch positions of the rotary switch from the evaluated two actual digitized switch position signal values,

and

performing a plausibility check such that the switch position angle is deemed to be plausible if the sum of the respective squares of the digitized actual switch position signal values supplied to the first computer unit or the sum of the respective squares of the digitized actual switch position signal values supplied to the second computer unit is located in a predefined range.

4. The method of claim 3, wherein a faulty switch position angle is identified by comparing the switch position angles determined by the first and the second computer unit.

5. The method of claim 3, wherein if the plausibility check indicates that the switch position angle is not plausible, then the digitized actual switch position signal values supplied to the first or second computer unit, or the switch positions determined therefrom are identified as being faulty, and suitable measures are taken depending on the severity of the error.

6. The method of claim 3, wherein the two actual digitized switch position signal values are sinusoidal, and the switch positions are calculated in the form of the switch position angles α separately in the first computer unit through the relationship

$\alpha = \arctan [X1/Y1]$,

wherein X1 corresponds to the first digitized actual switch position signal value supplied to the first computer unit and Y1 corresponds to the second digitized actual switch position signal value supplied to the first computer unit, and in the second computer unit through the relationship

$\alpha = \arctan [X2/Y2]$,

wherein X2 corresponds to the first digitized actual switch position signal

value supplied to the second computer unit and Y2 corresponds to the second digitized actual switch position signal value supplied to the second computer unit,

wherein in each of the computer units a phase of the first digitized actual switch position signal value lags a phase of the second digitized actual switch position signal value by 90° and wherein the amplitudes of each of the digitized actual switch position signal values are constant.

7. The method of claim 6, and further comprising the steps of identifying angular ranges that correspond to detent positions of the rotary switch position angles $\alpha$ and associating discrete switch position angles $\alpha_D$ with the angular ranges.

8. The method of claim 7, wherein the computed switch position angles $\alpha$ or the discrete switch position angles $\alpha_D$ are exchanged between the first and second computer units and crosswise compared with each other.

9. The method of claim 8, wherein the determined switch position angles are identified as being faulty if the crosswise comparison indicates an insufficient agreement between the calculated switch position angles $\alpha$ or between the discrete switch position angles $\alpha_D$, and suitable measures are being taken depending on the severity of the error.

10. Use of the device of claim 1 in an industrial controller.

11. Use of the method of claim 3 in an industrial controller.